BIODIVERSITY
LEGAL
FOUNDATION

BY CERTIFIED MAIL

February- 5, 1998

303-442-3037

Jamie Rappaport Clark
Director
U.S. Fish and Wildlife Service
U.S. Department of the Interior
18th and C Streets, N.W.
Washington; D.C. 20240

Dear Director Clark:

Enclosed is our formal petition to list the Bonneville Cutthroat Trout (Oncorhvnchus clarki utah) as threatened in its occupied habitat within its known historic range, pursuant to Section 4 of the Endangered Species Act (16 U.S.C. 1531 et seq.). This petition is filed under 5 U.S.C. 553(e) and 50 C.F.R. 424.14 (1990) which grants interested parties the right to petition for issuance of a rule from the Assistant Secretary of the Interior.

We understand that this petition action sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service (USFWS) and very specific time constraints upon those responses.

Owing to the many threats facing the Bonneville Cutthroat Trout, as described in the enclosed petition, we urge the USFWS to act expeditiously upon Petitioners' request and make a timely 90-day petition finding for this species. Thank you for your consideration in this matter.

Sincerely,

Jasper Carlton

D. C. "Jasper" Carlton
Director

copy: Bruce Babbitt, Secretary of the Interior

P.O. BOX 18327 BOULDER, CO 80308-1327

BONNEVILLE CUTTHROAT TROUT

Oncorhvnchus clarki utah

By Certified Mail

February 5, 1998

IN THE OFFICE OF ENDANGERED SPECIES

U.S. FISH AND WILDLIFE SERVICE

UNITED STATES DEPARTMENT OF THE INTERIOR

Biodiversity Legal Foundation **P.O. Box 18237** **Boulder, CO 80308-1327** **303-442-3037** **Petitioner**	)	**Petition for a Rule to List the Bonneville Cutthroat Trout (Oncorhvnchus clarki utah as Threatened under the Endangered Species Act, 16 U.S.C. § 1531 et seq. (1973 as Amended)**

Introduction

The Biodiversity Legal Foundation hereby petitions to list as "threatened" the naturally spawning Bonneville Cutthroat Trout (Oncorhvnchus clarki utah) in United States

riverine and lacustrine ecosystems where it presently continues to exist and to designate its occupied habitat as "critical habitat" under the Endangered Species Act (ESA) within a reasonable period of time following the listing, 16 U.S.C. § 1531-1543 (1982). This petition is filed under 5 U.S.C. § 553(e), 16 U.S.C. § 1533(b)(3)(A) and 50 C.F.R. § 424.19 (1987) which give interested persons the right to petition for issuance of a rule.

Endangered Species Act Implementing Regulations

Several sections of the regulations implementing the Endangered Species Act (50 C.F.R.) are applicable to this petition. Those concerning the listing of the Bonneville Cutthroat Trout as a threatened species are:

> 424.02(e) "Endangered species" means a species that is in danger of extinction throughout all or a significant portion of its range." . . . (k) "species" includes any species or subspecies that interbreeds when mature.
>
> "Threatened species" means a species that "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range" (16 U.S.C. § 1532(20).
>
> 424.11(c) "A species shall be listed . . . because of any one or a combination of the following factors:
>
> 1. The present or threatened destruction, modification, or curtailment of habitat or range;
> 2. Overutilization for commercial, recreational, scientific, or educational purposes;
> 3. Disease or predation;
> 4. The inadequacy of existing regulatory mechanisms; and

5. Other natural or manmade factors affecting its continued existence."

All five of the factors set out in § 424.11(c) are applicable to the present status of the Bonneville Cutthroat Trout.

Sections relevant to the designation of critical habitat are:

> 424.12(a)(2) Critical habitat is not determined when one or both of the following situations exist: . . . (ii) The biological needs of the species are not sufficiently well known to permit identification of an area as Critical habitat.
>
> 424.12(b) In determining what areas are critical habitat, the Secretary shall consider those physical and biological features that are essential to the conservation of a given species and that may require special management considerations or protection. Such requirements include, but are not limited to the following: (1) Space for individual and population growth, and for normal behavior; (2) Food, water, air, light, minerals, or other nutritional or physiological requirements; (3) Cover or shelter; (4) Sites for breeding, reproduction, rearing of offspring, germination, or seed dispersal; and generally (5) Habitats that are protected from disturbances or are representative of the historic, geographical, and ecological distributions of a species.
>
> 424.14(d) Petitions to designate critical habitat. . . . Upon receiving a petition to designate critical habitat . . to provide for the conservation of a species the Secretary shall promptly conduct a review in accordance with the Administrative Procedures Act (5 U.S.C. 553) and applicable Department regulations, and take appropriate action.

This petition documents the need for the designation of critical habitat within a reasonable period of time following the ESA listing to provide for the conservation of the Bonneville Cutthroat Trout.

Based on the documentation provided below, the petitioner contends that the provisions of 50 C.F.R. compel the expeditious listing of the Bonneville Cutthroat Trout as "threatened" within its occupied habitats in the United States (U.S.) riverine and lacustrine ecosystems of its historic range and currently occupied habitat. Petitioner also requests a review and appropriate action to designate "critical habitat" for the species.

Petitioner

The Biodiversity Legal Foundation (BLF) is a non-profit, science based organization dedicated to the preservation of all native wild plants and animals, communities of species, and naturally functioning ecosystems. Through reasoned educational, administrative, and legal actions, the BLF endeavors to encourage improved public attitudes and policies for all living things.

Endangered and Threatened Species Listing Criteria Applicable to the Current Status Of the Bonneville Cutthroat Trout

1. The present or threatened destruction, modification, or curtailment of habitat or range;
2. Overutilization for commercial, recreational, scientific, or educational purposes;
3. Disease or predation;
4. The inadequacy of existing regulatory mechanisms; and

5. Other natural or manmade factors affecting its continued existence.

That is to say, all five of the Endangered Species Act (ESA) listing criteria apply to the Bonneville Cutthroat Trout. The manner in which these criteria apply will be discussed in detail below.

Historic and Current Status of the Bonneville Cutthroat Trout

According to Utah's Natural Heritage Program, the Bonneville Cutthroat Trout was "[f]ormerly thought to be extinct due to overfishing, degradation of habitat, and hybridization with introduced rainbow and cutthroat trouts" (Utah Wildlife Resources, Heritage Program, [1996]). Following the growth of interest in the trout, several remnant populations have been found; it is not extinct, but is in a threatened condition according to ESA listing criteria. In March 1997, Governor Mike Leavitt signed into law a legislative action that declared the Bonneville Cutthroat trout the "state fish" of Utah. It is hoped that this new prominence for the trout will add force to efforts for its conservation.

It should be noted that the Bonneville Cutthroat Trout shares the plight of many of the other freshwater fishes of the United States: "Within North America the number of freshwater fishes considered by the American Fisheries Society to be endangered, threatened, or of special concern increased

from 251 to 364 in the 1980s, a 31% increase" (Richter, Braun, Mendelson, and Master, 1997, p. 1082). According to these authors, this crisis is nationwide, but "exotic species, habitat removal/damage, and altered hydrologic regimes predominate in the West" (p. 1081). As will be seen repeatedly in the following document, the Bonneville Cutthroat Trout is subject to all of these detriments as well as others.

Bonneville Cutthroat Trout were plentiful at Anglo settlement, beginning in about the middle of the nineteenth century (Duff, 1996). Its largest geographical population center is within the Bonneville Basin, Utah, its historic native range, where the first state fish protection law was issued under the administration of Brigham Young in 1874. That was a measure to limit commercial harvest, and its purpose was the protection of fishery resources for the Mormon people (Draft Conservation Agreement and Strategy for Bonneville Cuthroat Trout [Onchorhvnch clarki utah] in the State of Utah, March, 1997 (hereafter Conservation Agreement, 1977). Danger to native cutthroat trout from overfishing was, thus, already apparent within a very short time after settlement. But many other threats were to menace the Bonneville Cutthroat Trout and other associated native fish species in the years to come. "[D]uring the last 150 years the Bonneville cutthroat trout metapopulations have been essentially eliminated through anthropogenic activities. This

loss of connectivity to sub-basins, non-native introductions [largely rainbow, brown, and brook trout], habitat fragmentation, and decreases in [Bonneville Cutthroat] throughout the basin continue to threaten its recovery and may even preclude its future survival" (Duff, 1996, p. 37).

According to Duff (1996), the Bonneville Cutthroat Trout was, some 8,000 years ago, an inhabitant of a great inland lake, Lake Bonneville. This lake is described as "glacial" (Duff, 1996) and "pluvial." It dried up at least 8,000 years ago, about the time human beings first began to build cities in the Middle East. The Great Salt Lake appears to be a remnant of Lake Bonneville which once covered most of the Bonneville Basin, much of Utah and parts of Nevada, Idaho, and Wyoming. It appears that at least three major populations of Bonneville Cutthroat Trout were, by reason of the drying up of this vast lake, geographically isolated in the elevated or highland rims around the former lake. Thus there developed three strains of Bonneville Cutthroat, now a stream trout. Duff (1996) speculates that owing to marked variations in ancient Lake Bonneville's water levels, some populations may have been isolated from time to time before the lake dried up. Thus some differentiation could have taken place earlier than the approximate 8,000 year B.P. date for the separation of populations.

These populations are described as "a Bear River group (shares some genetic characteristics with Yellowstone cutthroat trout), a Snake Valley group in Utah and Nevada at the western edge of the Bonneville basin, and two groups associated with the Bonneville basin proper (Northern and Southern Bonneville Cutthroat Trout), including the Ogden, Provo, and Weber river drainages (Northern Bonneville) and the Sevier river drainage (Southern Bonneville; this group shares an allele with some Colorado River cutthroat trout (Behnke 1992; Idaho DFCG 1994; Kershner 1995) (Global Species Abstract, [1996]).[1]

A curious feature of the Bonneville Cutthroat Trout is that the desiccation of Lake Bonneville seems to have left the trout in what is still its historic range: in the highland rim around the Bonneville basin. More unusual still, the trout's range does not seem to have been reduced in terms of geographic area (after the drying up of the vast lake) in the way many other threatened and endangered species' ranges were; that is, by incursions of human activity around the perimeter of the range Instead, the trout's range has been internally shattered by abuse of the stream systems it lives in, so that although the trout still lives in the general area of its earlier range, the fish present now consist mainly

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[1]Although this report is not itself dated, it bears a note: "Wyoming Natural Diversity Database, Laramie, WY--Information-as of January, 1996."

of remnant or hybridized populations, often hanging on only in the highest and most rugged reaches of its streams. Additionally, the range model has been blurred, because some of the pure Bonneville Cutthroat Trout populations now existing are transplants that have been deposited in streams not formerly in its range. These transplants became necessary, since most of the trout's native (original) streams have been rechanneled, de-watered, and dammed by ranchers and farmers. Livestock grazing has sedimented the streams, damaging spawning substrates and raising water temperatures. Mining has released chemicals and sediment into the waters. Road building has added further sediments and sometimes "traps" that prevent fish migration.

A few populations of Bonneville Cutthroat exist outside of the Bonneville basin proper; Duff (1996) and others believe this may have occurred as a result of temporary stream captures over time.

Although the Bonneville Cutthroat Trout is now essentially a fish of western mountain streams where it took up residence when cut off from Lake Bonneville, it is found at least in Bear Lake (Wyoming-Idaho border) and Lake Alice (Wyoming). Duff (1996) states that Bonneville Cutthroat Trout evolved mostly "in a lake (lacustrine) environment. Upon desiccation of Lake Bonneville, trout were primarily restricted to perennial tributaries and to connected

watersheds and sub-basins; only Bear Lake, Utah Lake, and Panuitch Lake retained lucustrine populations" (1996). It is known that of the three lakes mentioned by Duff (1996), only the Bear Lake population survives; the others have been extirpated.

The Bonneville Cutthroat "[r]anges from high-elevation streams with coniferous and deciduous riparian trees to low-elevation streams in sage-steppe grasslands containing herbaceous riparian zones" (Global Species Abstract, [1996]). "Low elevations" in this context are relative, since all of the large area in question is situated on the high intermountain continental plateau.

Duff (1996) subdivided the surviving Bonneville Cutthroat in the Bonneville Basin into four "hydrogeographic" areas for purposes of his 1996 conservation assessment: "(1) The Bear River Bonneville cutthroat trout (BRB), including those population[s] within the Bear River basin of Utah, Idaho, and Wyoming, from its headwaters to entry into the Great Salt Lake; (2) Northern Bonneville cutthroat trout (NB), which includes the waters of the Ogden, Weber, Jordan, and Spanish Fork Rivers, and the Utah Lake sub-basins; (3) Southern Bonneville cutthroat trout (SB), which includes the Sevier River, Sevier Lake, and Escalante Desert sub-basins, as well as the Upper Virgin River sub-basin in the Colorado River Basin, where several transplanted populations exist;

and (4) Western Bonneville cutthroat trout (WB), which includes the Utah-Nevada portion of the Great Salt Lake Desert from the Raft River Range on the north to the Snake Valley area on the south, also including a 'closed sub-basin' in adjacent Nevada, where several transplanted populations occur" (Duff, 1996, p. 37). Duff mentions that this overall . transplanting within its range, in an effort to restore the fish, may create undesirable genetic mixing. There appears to be some discussion presently among geneticists and taxonomists of a possibility that the Bear River population may have differentiated sufficiently to justify declaring it a separate subspecies. Duff's subdivision of these trout varieties is very similar to that used by the agencies of the states involved.

Duff, for purposes of his 1996 conservation assessment, assumed, based on historical materials, that Bonneville Cutthroat Trout populations were found in "up to 90% of most perennial waters [historically]" (Duff, 1996, p. 38). He further assumed that "25% of the intermittent stream miles were historically once perennial waters which have been altered by anthropogenic activities" (p. 38).

Present Legal Status of the Bonneville Cutthroat Trout

The Bonneville Cutthroat Trout is not presently listed under the ESA as either Threatened or Endangered.

Considerable activity or planned activity on the trout's behalf by the U.S. Forest Service, the Bureau of Land Management (BLM), and the state agencies of the states where the fish still exists seems to be aimed at avoidance-of such a federal listing. The fish is subject to management by the Forest Service on National Forests, of which there exist a number in the Bonneville Cutthroat's range. According to Duff's (1996) candid assessment of the Bonneville Cutthroat, the trout seems to be in better condition, if not in good condition, on Forest Service lands than on other lands.

Both public agencies and private organizations have designated the Bonneville Cutthroat Trout as a species in difficulties. The U.S. Fish and Wildlife Service (FWS), following a 1980 status review, classified the Bonneville as a Category II species; in 1985, the FWS reclassified it as a Category I species--that is, a candidate for Endangered Species Act listing. However, as of 1994, the FWS had again reclassified the trout as "a declining candidate species, Category II)" (Duff, 1996, p. 38). In 1996, the FWS "has discontinued their Categorical status, and only those species previously identfied as Category I are now considered candidate species" (Duff, 1996, p. 38). Such have been the ups and downs of the so-far luckless Bonneville Cutthroat Trout. Since it was classified as Category II as of 1996, when Category II was discontinued, it ceased to be a candidate

for ESA listing even though it is well and publicly known to be in serious trouble, especially in some geographic aras within its current occupied habitats. Review of the literature suggests that perhaps some of the trout's reclassifications may have been in part due to the discovery of a few more remnant populations (Duff, 1996). These, however, have merely been a few more remnant populations, in the same kinds of trouble as the populations previously known.

The American Fisheries Society (AFS) classified the Bonneville as 'threatened' as early as 1979, and in 1989 as "endangered."

The General Summary issued by the Forest Service (July 1996) was succinct:

Bonneville Cutthroat (BCT)2

Bonneville Basin (Overall Summary):
- total occupancy 234 stream miles, 81 populations.
- NFS [National Forest Service] lands occupancy 83%, BLM 14%, and State/other 1%.
- NFS occupancy 48% UT, 33% WY, 14% ID, 6% NV.
- 90% of stream in Basin had historic occurrence of BCT.
- extirpated in historic sub-basins: 50% UT, 75% NV, 33% ID, 50% WY.
- NFS lands extirpated in 67% of NF sub-basins on 9 NFs.
- extirpated in 76% UT sub-basins (6 NFs); 43% ID sub-basin (2 NFs) and 100% extirpated in all 13 sub-basins on 3 NFs.
- estimated 5,131 historic stream miles in Basin.
- current occupancy only 3.7% of Basin's historic stream miles.
- current occupancy only 11.5% of NF historic stream miles
- BCT is 96% extirpated in Basin's historic streams.
- BCT is 87% extirpated in NF historic streams.

- NFS have 81% of occupied stream miles & 83% of populations.
- NFS lands have 32% of Basin's historic stream miles.
- NF habitat condition: 13% excellent, 49% good, 18% fair, 11% poor, and 2% extremely degraded.

•72% populations secure-stable, 25% at risk . (declining, 3% unknown).
*habitat declines due to sedimentation from grazing (up to 100%), mining and roading (50%), logging (22%), dewatering and channel changes (44 to 89%).
*basin-wide habitat fragmentation and loss of meta-populations.
*exotic fish threaten recovery; presence in occupied sub-basins are rainbow (67%), brown (51%), brook (9%), matchery cutthroat (61%).

Western Bonneville Population (West desert UT-NV)
*extirpated in 78% of historic sub-basins.
•<1% occupied habitat (of 427 stream miles historic); 2 populations on 1 NF.
•99% extirpated in historic streams in 7 sub-basins.
•3.2% occupancy (2 populations on 1 NF) in 132 stream miles of potential habitat.
•96% extirpated in streams on 4 NFs.
- l%occupancy in Snake Valley arm of historic Lake Bonneville.

*estimated recovery in streams: 47% NF, 25% NPS (National Park Service], 27% BLM [Bureau of Land Management], 2.5% other.
*declines due to exotics, mining, grazing, dewatering, and roading.
*exotic species are threats to population recovery in all 7 sub-basins.

Bear River Bonneville Population (Bear River, UT, ID, WY) :
'estimated 1,958 historic stream miles (29% on NFs).
- 7% current occupancy (140 stream miles); 25% occupancy on NFs.

•96% extirpated in all historic waters in 6 sub-basins; 65% extirpated on NFs.
*declines are due to grazing, channel change, dewatering, and roading.
•exotic species are threats to all populations.

Northern Bonneville population (Great Salt Lake-Utah Lake:
*estimated 1,178 historic stream miles (38% on NFs).
•1.6% current occupancy of historic NF habitat.
•99% extirpated in historic sub-basin waters.

•98% extirpated in historic NF sub-basin waters.
*habitat condition fair to good but "at risk" due to dewatering, grazing, and channel changes.

southern Bonneville (Sevier-Virgin Rivers):
-estimated 1,565 historic stream miles (31% on NFs).
'7.6% current occupancy on NF historic waters.
'98% extirpated in sub-basins historic waters.
'92% extirpated on NF historic waters.
•NF habitat condition: 39% excellent, 31% good, 22% fair, 8% poor to extremely degraded
•declines due to grazing, logging & roading, and dewatering.

Description of Species and Natural Ecology

The Bonneville Cutthroat Trout has been differentiated from other native cutthroat trout--all of which are also in serious trouble in the west--by means of sophisticated laboratory techniques for biological identification: DNA, meristics, and electrophoresis are named by Duff (1996) and others, particularly in the critical identification work done by Dr. Behnke (1996). There is some variation in various authors' handling of the number of broad population segments, perhaps owing to special considerations of the states. Idaho, for example, produced its Conservation Assessment (1994) referring to five populations. This appeared to have been because it seemed appropriate to these authorities to differentiate the Bear River and Bear Lake populations.

No general description of the western Cutthroat Trout was found in the literature. A small to medium sized freshwater fish, it has been considered a primary game and

food fish ever since white settlement, a circumstance that has been much to its detriment in terms of species survival. Nineteenth and early twentieth century photographs of Western sportsmen often show them happily surrounded by enormous trout catches. The presence of the exotics, so destructive to the native cutthroat--the rainbow, the brown, the brook, and the lake trouts--dates from this period. Most western waters were very nearly fished out well before the turn of the twentieth century, and these exotics were used to replace the disappearing native species. No explanation has come to light as to why these particular fish were used for this purpose rather than the decimated native cutthroat. Petitioner assumes that the exotics, which can be produced faster in hatchery conditions, were simply used to provide recreational fisheries in waters where native fishes were being depleted.

Indeed, it is widely believed that the greatest threat to the Bonneville Cutthroat Trout's continued existence is probably its exotic rivals. "These species are thought to replace the native fish through competition or predation, but these explanations have not been confirmed" (Kershner, 1995, p. 32).

Although there seems to be no particular description of the native inland cutthroat trout, since its subspecies have all been described separately, it may be said that the Bonneville Cutthroat Trout is a Salmonid and is formally and

specifically described as: "Dorsum yellow-brown to steel-gray, with paler sides, belly yellow to off-white; tail, back, and sides marked with large round spots; bright red stripe on each side of lower jaw [the distinguishing mark of cutthroat trout]; coloration subdued compared to other cutthroat trouts, but some populations exhibit bright reddish-orange spawning colors (Spahr et al. 1991; Global Species Abstract, [1996]).

"In winter, streams may have instream ice that reduces trout habitat; high flows occur in spring from melting snowpack, low flows occur in mid-to-late summer, when lethal and sublethal water temperatures may be common (Kershner 1995). Occurs primarily in small headwater streams; optimum habitat includes areas with a 1:1 pool to riffle ratio and slow, deep water with vegetated streambanks for shade, bank stability, and cover; prefers summer water temperatures of about 55°F but can survive in water up to 70°F; occurs also in lakes (e.g., Bear Lake), where the littoral and pelagic zones are typically used during most of the year (Spahr et al. 1991; Kershner 1995). Beaver ponds likely are important as both summer and winter holding habitat for adults (see Kershner 1995). Spawns in clean sand/gravel substrate in cool flowing water, in pool tails and in pockets of gravel in pools and riffles. Adfluvial populations may spawn in the lower portions of a stream whereas resident populations may spawn in higher gradient reaches of the same stream. Fry

generally move to stream margins when current is slow, and young of age 0 to age 1 may occur in complex pool habitats from summer through winter and in runs in summer (see Kersher 1995). In adfluvial populations, may [sic] young spend up to l-2 years in streams before migrating to the lake, or they may move to the lake during the first year (see Kershner 1995)" (Global Species Abstract, 1996; original citations retained).

"Bonneville cutthroat trout typically spawn during the spring and early summer months at higher elevations" moving up streams as the weather warms. Males sexually mature at about two years of age, females at three years. However, there seems to be considerable variation, depending, it appears, on the adaptations of the population. In Bear Lake, the trout may not begin to mature until they are age five and may not spawn until age 10. (Kershner, 1995).

"Fry typically emerge in mid-to-late summer, depending on spawning times. Once emerged, fry are poor swimmers and typically migrate laterally to stream margins. . . . Adfluvial Bonneville . . . . spend 1 or 2 years in streams before migrating to the lake. (Kershner, 1995, p. 29). Trout growth depends largely on "stream productivity," i.e., what there is to eat. Additionally, the sizes reached by the trout also seem to depend on their environment, with larger fish developing in Bear Lake.

"Specific habitats are apparently used for spawning, juvenile rearing, and adult rearing. In addition, these requirements may vary by seasons" (Kershner, 1995, p.). Kershner does not say what these specific habitats might be, and given the lack of other knowledge about the trout, they may not be certainly known. Kershner discusses a calculation of Bonneville Cutthroat needs, but remarks that it was a generic "Habitat Quality Index." It included such factors as "cover, bank stability, water velocity, maximum summer stream temperature, stream variation, nitrate nitrogen, and substrate to classify trout habitat. Most data specific to Bonneville cutthroat trout are anecodotal or unpublished" (Kershner 1995, p. 29). Later Kershner remarks: "Habitat requirements for young Bonneville cutthroat trout are poorly reported in the literature" (1995).

The Bonneville Cutthroat Trout "Eats mainly aquatic insects and terrestrial insects that fall into the water, and fishes . . ." (Global Species Abstract, 1996). "Both terrestrial and aquatic invertegrates appear to be important food items for stream-dwelling Bonneville. . . . Dipterans and debris were dominant food items for immature trout and terrestrial insects were the dominant prey for mature individuals" (Kershner, 1995, p. 30). Unsurprisingly, bigger Bonneville Cutthroat eat more fish. Those that grow large in Bear Lake prey upon "Bear Lake sculpin and Bear Lake cisco"

(Global Species Abstract, 1996; Kirshner 1996).

The Global Species Abstract also notes that the Bear River group is the only one to "persist in their native waters with introduced non-native trout (citing Behnke, 1992 and Idaho DF&G, 1994). The same report suggests that "Sculpins appear to be a minor predator (Kershner 1995)." "[Bear River Bonneville Cutthroat] [m]ay compete with syntopic fishes (e.g., mountain whitefish) for invertebrate prey (Kershner 1995)" (Global Species Abstract, 1996, original citations included).

"There is no literature that directly assesses the effect of diseases on Bonneville cutthroat trout" (Kershner, 1995). However, there are diseases present: for example, "The parasites plestophera and epitheliocystis have been found in the Bear River system and may affect Bonneville cutthroat trout. The bacterial diseases furunculosis and bacterial kidney disease are also found within the system. Hence, here is still another feature of the Bonneville Cutthroat Trout that has not yet been adequately researched.

One disease, however, is being watched by management authorities with apprehension: "Recently whirling disease was introduced into the Little Bear River, Utah. Although this disease is currently localized, there is a possibility that it may spread throughout the Bear River system" (Kershner, 1995, p. 31). "There is concern that whirling

disease may spread throughout the Bear River System" (Kershner 1995). This disease, still apparently affecting mainly rainbow and brown trout, seems to be spreading from one drainage to another and could become a grave menace to other western trout. Petitioner understands that whirling disease has been confirmed in Montana streams; Utah has confirmed its presence in the Sevier river system.

"The abundance and quality of the stream and lake habitat once available to Bonneville cutthroat trout have declined. . . . The primary causes of habitat loss have been water diversion, degradation of riparian habitats from grazing, road building, mining, and timber harvest. Probably the greatest single cause of habitat loss has been the diversion of stream flows. Diversions have fragmented stream habitats and disconnected tributary streams from mainstem rivers. These diversions reduce streamflow, preventing migration and creating thermal barriers. Many unscreened diversions attract migrating fish into the diversion canals and these fish are lost during irrigation. In St. Charles Creek, diversion during incubation caused a dewatering of 80% of the Bonneville cutthroat redds in the stream" (Duff, 1996; Kershner, 1995, p. 32).

Grazing, as it is currently practiced, is extremely destructive to fish habitat. "Poor grazing practices cause stream bank degradation by eliminating or reducing riparian

vegetation, physically damaging streambanks, and promoting active erosion. Final results are often a loss of pool habitat, reduced cover, increased water temperature, and substrates that are poorly suited for spawning and food production" (Duff, 1996; Kershner, 1995, p. 32). There is no doubt that the intensive grazing found in these western states is a major factor in the decline of many species, among them the Bonneville Cutthroat Trout. Further, according to the Briefing for Regional Forester, April 1, 1997, "Recovery of riparian areas with cattle hasn't worked in the past, is not working now, and won't work in the future." In other words, in order to save the trout and the other creatures in its ecosystem, the cows have to be removed from riparian habitats. And this will be considerably more easily said than done. Probably only federal authority will be able to do it.

Still another hazard to the trout is road building. Like grazing, it contributes to sedimentation of streams, and, Kershner adds, ill-placed and ill-considered culvert construction can prevent upstream migration (1996; Duff, 1996). "This may have a significant effect on the genetic health of these populations" (Kershner, 1995, p. 32).

Logging is still another of the contributors to the trout's predicament (Duff, 1996; Kershner, 1995), although Kershner (1995) believes the effects of this factor may not be as severe as they once were. Likewise, mining produces

sedimentation, roading, and other ill effects; like logging, its effects are bad but its historical effects were worse (Kershner, 1995).

Kershner (1995) says "Angling has been shown to depress populations of cutthroat trout. Cutthroat trout may be more susceptible to angling pressure than are other salmonids" (p. 32). The reason for this appears to be that they are in some way easy to catch. One may wonder how much of the trout's decline may be or have been historically due to angling pressure, given the prompt, devastating effects of angling, very shortly after settlement.

Nomenclature

Originally called Salmo clarki utah, the name Oncorhvnchus clarki utah is now universally used to designate the Bonneville Cutthroat Trout. The trout's common name refers to its native location, the Bonneville Basin. The basin was named for a military explorer of the region in the 1830s, Captain Benjamin L. E. Bonneville, a French-born West Point graduate with a curious history which included his rescue as a child from the Paris Terror of 1793 by Thomas Paine.

Historic and Present Status of the Bonneville Cutthroat Trout in the States Comprising Its Historic Range

It will be seen that virtually all of the states in whose waters Bonneville Cutthroat Trout have been found (Utah, Nevada, Wyoming, and Idaho) have given the trout various ominous classifications and have prescribed some kind of conservation neasures for it. It is Petitioner's contention that these measures, though they often constitute important first steps, cannot and will not fully conserve (that is, recover) and restore the Bonneville Cutthroat Trout. More simply stated, current draft conservation agreements and strategies do not come close to the level of protection that would be mandated under a scientifically peer reviewed recovery plan for the Bonneville Cutthroat Trout as an ESA listed species.

Utah

According to the draft Conservation Agreement, Utah, (1997), The Bonneville Cutthroat Trout has a state classification of S1, "a species of special concern." As of January 1998, the Conservation Agreement has been signed by all parties, including the Fish and Wildlife Service. Its Goal is stated as "Ensure the long-term conservation of BCT (Bonneville Cutthroat Trout) within its historic range in Utah. Its objectives were listed as follows:

"1) Restore and maintain at least 62 conservation populations of BCT throughout 332.1 stream miles and 35,775 surface acres including a sufficient number of metapopulations where possible within five Geographic Management Units (GMU).

"2) Eliminate or minimize threats to BCT and its habitat to the greatest extent possible" (p. 2).

It may be noted that the state of Utah contains more than 62 populations of the Trout; and, in item No. 2, one may wonder what constitutes "possible" elimination or minimization of threats to the trout. This Conservation Agreement [1998] will be discussed further below.

The signatories to the draft Conservation Agreement (1997), Utah are: the Utah Department of Natural Resources; the U. S. Department of the Interior, Fish and Wildlife Service; The Bureau of Land Management, Utah State Office; the U.S. Department of Agriculture, Forest Service, Inter-mountain Region; the Confederated Tribes of the Goshute Reservation; and the Utah Reclamation Mitigation and Conservation Commission. "Separate Memorandum(a) of Understanding and Cooperative Agreements will be developed with additional parties and supporting Entities . . . as necessary to ensure implementation of specific conservation measures.

The following is the list of actions proposed for this complex coalition of federal, state, and citizen agencies and

individuals. As can be seen, these are broad action objectives rather than specifics:

"1. Determine baseline BCT population life history and habitat data.

2. Determine and maintain genetic integrity

3. Enhance, maintain and protect habitat

4. Selectively control nonnative species

5. Expand BCT populations and range through introduction or reintroduction from either transplanted (wildstock) or broodstock BCT raised in a designated hatchery.

6. Monitor populations and habitat

7. Develop a mitigation protocol for proposed water development and future habitat alteration, where needed" (pp. 6-7).

This Conservation Agreement [1998] is to be administered by "the Bonneville Basin Conservation and Recovery Team (BBCRT) in coordination with other involved states" (p. 7); its only actual authority lies in making recommendations to the Utah Division of Wildlife Resources. Who or what the BBCRT may be is not explained.

The BBCRT is to provide a "semiannual assessment of progress towards implementing actions identified in this agreement. . . " The purpose of annual and semiannual assessments is to "determine the effectiveness of this agreement and whether revisions are warranted" (p.8). A

further, somewhat curious, provision is "If threats to the survival of the BCT become known that are not or cannot be resolved through this or any Conservation Agreement, the Utah Division [through which other signatories are to be kept informed] of Wildlife Resources immediately will notify all signatories" (p. 9).

Further, the duration proposed for the Conservation Agreement, Utah, is to be five years. If all signatories agree that "sufficient progress" has been made in "conservation and recovery" of the trout, this CA is to be extended for another five years. Additionally, the authors of the Conservation Agreement (1997), Utah, "anticipate" that these provisions will "not entail significant Federal actions under the NEPA [National Environmental Policy Act], and will be given a categorical exclusion designation" (p. 9). There is reason to believe, however, that neither state nor federal agencies will take any restrictive or regulatory action. The apparent object of this statement seems to be the turning over of entire control of trout policy making and management to the state, with no actual involvement by the Forest Service. The Petitioner, however, believes that there is a major federal action involved.

There appear to be no provisions in case of internal disagreements or noncompliance among signatories. These provisions also end with a curious one: "No member or

delegate to Congress or resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit." (p. 9). Overall, it would be surprising if it were.

Petitioner does not believe that this agreement will significantly remove the threats to the species. It is unclear how a voluntary agreement/document that simply states Unenforceable goals, objectives, and action items will reduce threats to the trout. The mere existence of this document does not benefit the species. How will all implementation measures be funded and enforced? Moreover, the Petitioner reminds the FWS that failure to list, or to propose to list the Bonneville Cutthroat Trout based on this incomplete, conservation strategy would be illegal. Even if complete, the conservation strategy must be in place and must demonstrate its effectiveness in removing significant threats before it may serve as a basis to forego listing as a threatened or endangered species. To the extent that the conservation strategy lacks funding and limits participants to nonbinding commitments, the strategy does not remove actual threats to the species.

The Petitioner believes that there is very little evidence of accountability on the part of agencies to ensure

that actions will be taken. It appears that there are no federal "line item" budgets marked for the Bonneville Cutthroat. Petitioner knows of no National Forests that have asked for adequate "enhanced" budgets to deal with the trout's full recovery.

It may be worthwhile here to insert Attachment A of the Draft Conservation Agreement (1997), Utah, which lists the "Supporting Entities" which favor the proposed agreement, or such an agreement: Trout Unlimited, Utah Council; Utah Rivers Council; Wyoming Game and Fish Department; Nevada Division of Wildlife; Idaho Fish and Game Department; Colorado State University [possibly because of this university's connection with biochemical subspecies identification]; Utah State University; and Brigham Young University.

The Conservation Agreement (1997), Utah accepts a five-part division among the subspecies of the trout, as does Idaho: This includes, Bear Lake; Bear River; Northern Bonneville; West Desert; and Southern Bonneville. This is similar but not identical to the four-part classification by used by Don Duff, (1996), in which the Bear River and Bear Lake Bonneville are lumped together, and the other populations include Western Bonneville, Northern Bonneville, and Southern Bonneville.

Wyoming

According to the Global Species Abstract (1996), the trout carries a state classification of S2 in Wyoming, and has a Heritage Global Rank of G4T2.

This somewhat truculent declaration precedes Wyoming's Bonneville Cutthroat Trout Inter-Aaencv Five Year Manasement Plan (1993-1997) (Remmick, Nelson, Walker, and Henderson, [1993]):

> The purpose of this plan is to promote complete cooperation in planning, management and operations between the involved agencies [Wyoming Game and Fish Department, Bridger-Teton National Forest, and the Bureau of Land Management] to protect, maintain and improve the habitat for Bonneville cutthroat trout populations on public lands. The intent of the actions listed in the plan is to prevent the trout from becoming a federallly listed species in Wyoming under the Endangered Species Act. Goals, objectives and action items are included to protect, improve and monitor the trout populations and their aquatic and riparian habitats.
>
> Nothing in this plan shall be construed as obligating any of the agencies in the expenditure of funds or for the future payment of money in excess of appropriations authorized by law. In addition, nothing in this plan shall be construed as obligating any of the agencies to actions inconsistent with current agency management plans. This plan does not meet the intent or requirements of the National Environmental Policy Act. (Remmick et al. [1993])[1]

This plan was established for a period of five years, 1993-1997. The Introduction points out that the native range of the Bonneville Cutthroat in Wyoming covers about 2500 square miles, or "only about 2.5% of Wyoming's land area"

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[1]The Management Plan carries no date, but was only signed by the participants in the early months of 1994.

(Remmick et al., [1993], p. 1).

"Bonneville cutthroat trout taxonomy has been evaluated primarily by Dr. Robert Behnke using meristic characteristics" (Remmick et al., [1993]). Behnke's work seems to be widely used in this evaluation, and its trout characteristics are designated (A) (pure); (B) "essentially pure with only very minor differences in meristic characteristics or the water had a history of stocking non-native O[ncorhynchus] species"; (C) with evident hybridization; and (D) "fair representatives but definite hybridization evident" (Remmick et al., [1993], p. 6). "A" rated Bonneville Cutthroat were found in 37% of the state's stream miles and Lake Alice; B rated were found in 56%, and "C" rated in 7% of the area's stream miles" (Remmick et al., [1993], p. 6).

A sampling taken in 1991-1992 (the last before the development of this plan) "showed an average population density of 260 Bonneville cutthroat trout/mile with a range of 0 Bonneville cutthroat trout/mile to 792 Bonneville cutthroat trout at some stations" (p. 1). Again, the drought during the later 1980s seems to have hampered the gathering of useful data as well as harmed the trout. Figure 3 in this Plan is a circle graph showing land ownership: Private ownership, 48.5%; Forest Service, 28.9%, State of Wyoming, 8.9%, and Bureau of Land Management, 13.6%, indicating

possible cooperation problems.

"Bonneville cutthroat trout from the Daniel Hatchery [broodstock of pure Bonneville cutthroat developed by the Wyoming Game and Fish Dept.] were used to stock waters with less pure cutthroat, introduce cutthroat trout into native waters after removal of non-native trouts, and introduce cutthroat trout into native waters if a natural or man-induced catastrophe occurs, e.g. severe drought, oil spill" (p. 6). Some removals of non-natives were planned.

To alleviate fishing pressure, special limits were instituted on the "Thomas Fork and Smith's Fork Drainages on public lands." It appears that there is more fishing pressure in some areas than others, probably due to accessibility or lack of it.

Management goals for the five year plan were listed as: 1) population and habitat monitoring including watershed inventories, 2) increasing the Bonneville cutthroat trout's range, 3) initiating watershed improvement practices, and 4) developing a public awareness program" (Remmick et al. [1993].

Actions to be taken include: 1) It is further stated that measurements will be standardized so that indices can be built for future measurement. Structural work will be used only in cases where "immediate attention" is required (see below). It appears that lack of cooperation in the matter of grazing has rendered this option unattractive.

2. "Waters with little or no known fishery data will . . . be surveyed" and Bonneville Cutthroat will be stocked in fishless waters or in waters where non-natives have first been removed. Stock purity will be increased by introducing classification A Bonneville Cutthroat into waters containing B or C grades.

"A watershed improvement program will be initiated within the Coat Creek (Thomas Fork) drainage. This drainage is in very poor condition; and, although improved grazing practices have been demonstrated in a part of the drainage on Huff Creek (Remmick et al. 1987), these practices have not been implemented in the rest of the drainage. The Plan indicates that the BLM plans to "coordinate habitat evaluations with livestock management." They probably should have added: "if possible."

4. The public awareness program: "We have to demonstrate the importance of saving the Bonneville cutthroat trout for its fisheries management potential and its uniqueness as a true native. Also it is important for the public to understand that management will become more restrictive if the Bonneville cutthroat trout is federally listed" (Remmick et al., [1993], p. 11). Again, this may present some difficulties in the political and social climate of much of the community they wish to persuade.

In 1981-1983, the Wyoming Game and Fish Department began construction of a restoration project in the Huff Creek Drainage of the Thomas Fork Drainage. This was an attempt to repair damage to the stream caused by cattle grazing-and herbicides using direct physical means. "Aerial photos taken in 1940 show Huff Creek as a stable stream; beavers Castor canadensis had produced many ponds and there were numerous patches of willow Salix sp. . . . At that time, cutthroat trout were abundant. . . . By 1978, common habitat flaws included closely grazed riparian vegetation, severe bank erosion, excessive siltation, and unnaturally high summer water temperatures. . . . Willow patches and beaver ponds were few; the stream was wide and shallow in many places . . . and the cutthroat trout population had markedly decreased" (Binns and Remmick, 1994). "During 1981-1983 a WGF construction crew installed 36 low-profile wooden dams (plunges . . . 9 rock plunges, 7 wire trash catchers, a wooden double deflector, a rock deflector, 14 small rock grade controls, and 3,760 ft of rock bank revetments. All structures were built in the lower two-thirds of the large exclosure [excluding cattle]. Labor, materials, and equipment cost U.S. $16,730. A backhoe and dump truck aided in the construction, but some rock revetments were placed by hand where banks were inaccessible to heavy equipment" (Binns and Remmick, 1994, p. 671).

The costs the authors quote for just one degraded stream are in 1981-1983 dollars. This construction and mechanical correction remedy for damaged streams would become expensive for a state wildlife department budget if it were used to repair many drainages. Other troubles that might accompany such an attempt are suggested too: "Exceptional cooperation by the Smiths Fork Grazing Association made the grazing control possible" (p. 671). However, the authors are saying, probably correctly as a matter of experience, that this grazing association is "exceptional" and restriction of grazing was a necessary part of this strategy in improving Huff Creek trout habitat as it is in many, probably most Western Bonneville Cutthroat locations. "When damaged fence allowed livestock into a Huff Creek exclosure, trampling and grazing of streamside plants was soon noticeable" (Binn and Remmick, 1994, p. 677). In fact, the Wyoming Management Plan (Remmick et al., [1993] stated that "Current management direction is steering away from habitat structure work as a solution to habitat degradation since it does not address management problems associated with livestock grazing, timbering activity, oil/gas exploration and development, etc." (p. 10).

However, the Huff Creek project did have positive results for the Bonneville Cutthroat in it, although it appears that results were difficult to calculate because of a

series of drought years'that negatively affected water levels. The authors write that the trout were more stable during drought years than they had been before the improvements.

Idaho

Idaho's draft Habitat Conservation Assessment and Strategy Bonneville Cutthroat Trout (Oncorhvnchus clarki utah) (1994) (Idaho Department of Fish and Game, 1994) leaves no doubt that this agency, like the others, understands very well what the threats to the Bonneville Cutthroat are. "This conservation strategy, developed by the State of Idaho, applies to all lands within the range of BCT within the State of Idaho with exception to National Forest lands within the Thomas Fork drainage. However the standards and guidelines in the Conservation Assessment and Strategy (Idaho Department of Fish and Game, 1994) will apply only to the public lands. However, rangewide implementation will be required to improve conditions for the BCT. Habitat on both public and private land must be improved to insure [sic] connectivity between populations and throughout the range of individual populations. Where substantial benefits for BCT restoration can be achieved on private land, agency personnel will seek commitment to the Conservation Agreement by private landowners" (p. 1). As the other entities involved in the Bonneville Cutthroat problem all seem to agree, close cooperation will be needed to deal with intricate ecosystem

considerations as well as human interests; and private owners have not been the most cooperative of participants in similar cases. Once the Bonneville Cutthroat Trout is listed as threatened, Habitat Conservation Plans (HCPs) made with private landowners would be useful in addressing this problem.

Idaho's conservation strategy only covers one metapopulation (or two, depending on whether the Bear Lake and Bear River Bonneville Cutthroat populations are considered separately). These populations are different from the other populations according to The Conservation Assessment and Strategy (Idaho Department of Fish and Game, 1994). These trout are the "only forms of this subspecies able to persist in their native waters with introduced non-native trout. Also, Bear Lake cutthroat trout express delayed maturation, long life span, fish-eating feeding habits, and exceptional overwinter growth" (Idaho Department of Game and Fish, 1994, p. 2). Most of these features of this particular subspecies were mentioned by Kershner (1995). "Kershner (1993) determined that BCT were distributed in less than five percent of their original (19th century) range" (Idaho Department of Game and Fish, 1994, p. 2).

The Conservation Assessment and Strategy mentions further that the "U.S. Fish and Wildlife Service (USF&WS), Idaho State Office USDI Bureau of Land Management (BLM), Idaho State Office USDA Forest Service, Caribou National Forest"

(p. 2) acted as advisors in preparation of the document, hence it merits close examination. Some of the agencies mentioned are now well and publicly known as obstructors of ESA listings and, in many cases, implementers of management practices which are destructive to ecosystems and their dependent wildlife.

Relevant to the Bonneville Cutthroat Trout in Idaho is a recent attempt by the Forest Service to authorize a timber sale, Bailey Creek area, in Caribou National Forest. This was appealed on September 25, 1996 by the Greater Yellowstone Coalition, citing under two major headings a wide variety of failures to comply with environmental and public information laws. After informal discussions between the Greater Yellowstone Coalition and the Forest Service, the Coalition reduced its complaints to those which were crucial to the validity of the timber sale's legality. These involved "Specific allegations and objections including inadequate consideration of water quality, wildlife, and plants, and failure to protect the viability of Bonneville cutthroat trout remain as appeal issues" (U.S. Forest Service, October 30, 1996).

It is a point of interest here that some of these inadequacies may have stemmed from Forest Service modeling of sedimentation (a major threat to the trout) that could be expected from the proposed sale. Modeling for such considerations can be useful, but is easily skewed by the

degree to which the factors involved are used or not used in the modeling.

On November 14, 1996, the Forest Service reversed the Bailey Creek Timber Sale authorization on the grounds that a portion of the Environmental Assessment had not been adequately carried out and must be revised. It appears that the sale has not been stopped, but only postponed pending new figures from the Forest Service.

According to the Idaho Department of Game and Fish (1994), some populations of the trout were located in 1993 on tributaries of the Thomas Fork of the Bear River other than those known at Dry, Giraffe, and Preuss Creeks. These populations were examined by Dr. Behnke of Colorado State University and were found to range from very pure Bonneville Cutthroat stock to considerable hybridization with "Yellowstone cutthroat, rainbow, and Lahontan cutthroat trout" (Idaho Department of Fish and Game, 1994, pp. 2-3).

According to the Conservation Assessment and Strategy (Idaho Department of Fish and Game, 1994), "Trends in BCT population density in the Thomas Fork tributaries have been monitored at least biannually since 1985. Densities decreased from 1985 through 1993 as indicated by the downward trend of BCT parr $\geq$ 75 mm) in Preuss Creek.

. . .Continuous drought conditions occurred from 1987 through 1992. Poor habitat conditions probably exacerbated the

effects of the drought on BCT growth and survival" (Idaho Department of Fish and Game, 1994, p. 5). This report is followed by the comment, "We have no trend information on stream populations outside the Thomas Fork drainage" (p. 6).

Bear Lake, the largest lake in the Bonneville Basin harboring the lacustrine strain of the trout, lies across the Idaho-Utah border. The Conservation Assessment and Strategy remarks that other lentic occurrences have been noted in "Alexander Reservoir and . . . [perhaps] Oneida Reservoir" (Idaho Department of Fish and Game, 1994, p. 8). "These are mainstem hydropower reservoirs on the Bear River which have very rapid water exchange rates. Several tributaries to Bear Lake historically provided spawning grounds for Bear Lake cutthroat trout. In the past two decades, however, only four streams: St. Charles, Fish Haven, Swan (Utah) and Big (Utah) creeks, have not been completely dewatered to satisfy irrigation demand, and in some years Fish Haven and Big Creeks are dewatered" (p. 8). It is clear that in Idaho, dewatering is a serious problem for the trout. The Conservation Assessment goes on to state that even St. Charles Creek was interrupted in 1992; that if Fish Haven were to be used as potential trout spawning grounds, "assurance from irrigators that sufficient water would be left in the stream for trout would be necessary"; and that similar conditions pertain on the Utah side of the border (Idaho Department of Fish and

Game, 1994, p. 8).

"All the cutthroat spawners that arrive at the Swan Creek trap, about 200 yards from Bear Lake, have been captured and spawned artificially since 1975. From the mid-1970s through 1990, 80% of the spawners entering St. Charles Creek were spawned artificially. A trap was established in Big Creek in 1987. . . . All fish trapped were artificially spawned" 1987-1989 but complete dewatering for irrigation ended this run. (Idaho Department of Fish and Game, 1994, p. 8).

The Idaho Department of Fish and Game (1994) summarized the threats to the Bonneville Cutthroat thus: "Stream dewatering and channelization, damage to riparian areas from livestock overgrazing, herbicide application in riparian zones, road building, oil spills and increased fishing pressure were listed by Binns (1981) as important issues that would need to be addressed by state and federal agencies. In addition to Binns' list, BCT are lost in unscreened irrigation ditches and are unable to mix within drainages or return to natal spawning sites because of migration blockages of irrigation diversion dams. Additionally, in some cases poorly designed road culverts become migration barriers" (p. 11). The Idaho Department appears to believe that it has coped with the overfishing problem by closing fishing in known trout streams. Binn's

list of hazards elaborates (from Idaho Department of Fish and Game, 1994, p. 11): "Silt pollution and thermal pollution are severe in some tributaries, especially in the Thomas Fork drainage. Active stream bank erosion contributes much silt to the streams. At the same time, riparian vegetation is often much reduced and the lack of shade allows the sun to warm the water. . . . the present poor habitat for cutthroat trout reflects past watershed abuses, such as livestock overgrazing and the removal of streamside shrubs with herbicides" (p. 11).

Thus the list of hazards continues, as it becomes evident that many of these are the results of overgrazing in addition to irrigation practices: "Streambanks damaged by trampling, erosive stream velocities caused by channelization and irrigation return flow laden with sediments. . . . peak water temperatures of near 27C (80F) in some Thomas Fork tributaries in Wyoming. . . . wide, shallow streams, without adequate riparian vegetation as occurs in overgrazed areas would contribute to such high temperatures and wide fluctuations. The same habitat alterations would cause icing in winter" (Idaho Department of Fish and Game, 1993, p. 12).

The catalogue of damage goes on: Loss of vegetation exposes stream banks to accelerated erosion; "Mechanical straightening of streams has increased stream velocity and erosive force. . . . The result often is downcutting and

chronic unstable, poorly vegetated stream banks" (Idaho Department of Fish and Game, 1994, p. 12).

Additionally, woody vegetation and cover for the trout have suffered from the same causes. Increased sedimentation has damaged substrates needed by the trout for spawning. "Excessive fine material fills interstitial spaces, reducing habitat for aquatic insects and overwintering small trout" (Idaho Department of Fish and Game, 1994, p. 13). Migration barriers are a serious threat to the trout as dewatering and retention dams for agriculture have cut off their migration routes. "In some cases authorized rights to divert water exceed the entire stream flow. . . . In other instances, individuals divert more water than they are allocated which may also dewater streams" (Idaho Department of Fish and Game, 1994, p. 13).

The Conservation Assessment and Strategy (1994) points out that historically, the trout were obtained commercially. "In the early 1900's 600 to 2,000 pounds a day; . . . of BCT were harvested with nets during their spawning run at the mouth of St. Charles Creek in Bear Lake" (p. 13), When this ended, "[L]ocalized harvest with pitchforks continued in the stream into the latter half of the century" (p. 13).

Fish stocking is a hazard widely recognized among trout experts, and "Hybridization may cause the loss of rare alleles within the BCT population which enable these fish to

survive catastrophic events such as prolonged drought and associated high water temperatures (Kershner, 1993)" (Idaho Department of Fish and Game, 1994, p. 14). The majority of stocked fish in the Bonneville's range have been rainbow trout (the species now increasingly attacked by whirling disease), but there has also been some stocking of other, but nonnative, cutthroat. "Disease has not been identified as a significant factor in the decline of the native BCT. However, stocking hatchery reared trout may pose a disease risk to wild stocks" (p. 15). The Conservation Assessment cites Kershner's (1993) comments on diseases among trout populations in the west, and adds that there may be some predation by brown trout. However, competition from the brown trout may be significant. "Competition with non-native salmonids is believed to be a major factor in the decline of cutthroat trout throughout the western United States (Behnke 1992). . . . Brown trout are the primary salmonid competitor with native cutthroat and mountain whitefish in the main stem Bear River" (Idaho Department of Fish and Game, 1994, p. 16). The Department does not believe that rainbow are serious competitors in Idaho and that they seldom survive seasonally to spawn naturally.

An "Interagency Bonneville cutthroat trout conference" was held in Salt Lake City March 25, 1987. All the states reported that some measures were being taken on behalf of the trout; "Surveys done in recent years within part of the

historical drainages had found additional BCT populations" (Idaho Department of Fish and Game, 1994, p. 16). "Some grazing management plans had been changed to benefit BCT habitat. Additionally, commitments were made by agencies within each BCT state to improve BCT status. Based on this information the USF&WS recommended that the listing package be withdrawn indefinitely" (p. 17).

Thus the Idaho Department of Fish and Game (1994) provides the most detailed and gruesome picture of the plight of the Bonneville Cutthroat Trout--but it is similar to what has happened to the trout throughout its historic range. To provide a last note on this subject, the Conservation Assessment and Strategy states that Bear Lake has been artificially stocked with Bonneville Cutthroat for "the past twenty years . . . after recognition that most and at times all water was removed from spawning tributaries for irrigation . . . [t]here was concern that if Bear Lake cutthroat trout were not spawned artificially, there would be no spawning of these fish at all" (p. 18). The Department recognizes that this could reduce genetic variation in the stock; but what is apparent is the entire lack of concern for the situation by landowners who consider themselves entitled to the water.

The Department has responded with scientific studies (much needed), and with hopeful plans for inducing landowners to cooperate in restoration plans. The strategy adopted by

the Department is that of "Frissell (1993) and Rieman and McIntyre (1993), PACFISH (USDA Forest Service and USDEI Bureau of Land Management 1994, in draft), and FEMAT Report (Forest Ecosystem Management Team, 1993). PACFISH is an ecosystem based, aquatic habitat and riparian area management strategy for anadromous fish habitat on lands administered by the USFS and BLM" (Idaho Department of Fish and Game, 1994, p. 20).

Nevada

There was virtually no current material available for the threats to or conservation efforts for the Bonneville Cutthroat Trout in Nevada from the Nevada Department of Wildlife until October of 1997 when the Nevada Natural Heritage Program provided some recent data from "[b]iologists for the Division of Wildlife" (Clemmer, letter, 1997, October 3). Glenn Clemmer of the Nevada Natural Heritage Program provided this current information in October 1997:

> Bonneville Basin:
> Hendry's Creek contains a stable headwater population of pure BCT in some 7.1 miles of habitat.
> Hampton Creek has a pure, but introduced, population of BCT in 2.5 miles of habitat.
> Outside Bonneville Basin:
> Goshute Creek, approximately 3.5 miles of stream supports a pure, stable population of BCT.
> Pine and Ridge creeks, on the west side of Wheeler Peak, support stable populations of the trout.
>
> Additional conservation management efforts underway:
> Smith Creek, Deadman Creek, and Deep Canyon Creek have been chemically treated for exotics and will be stocked with BCT this year, adding 12 miles of BCT habitat.
> The Division of Wildlife has proposed treating a series of streams and introducing BCT in and around the Great Basin

National Park. Planning is underway with personnel of the Park. (Clemmer, letter, 1997, 3 October)

The last word of the trout from the Nevada agency however was in 1987 when this department produced a . "Bonneville Cutthroat Trout Species Management Plan."

The Forest Service has some word about Bonneville management in Nevada on National Forest land: a portion of a Forest Plan for the Humboldt National Forest that may have been amended in 1990. Petitioner believes that the trout is "at risk" on the Ely Ranger District as the agency continues to favor mining and grazing there.

The available portion of the Humboldt Forest Plan does include adequate measures for conservation of the Bonneville Cutthroat Trout, such as "Accomplish structural improvement work in suitable areas to improve habitat for Lahontan and Bonneville Cutthroat Trout" and "Strive to achieve and maintain at least 90% of the natural bank stability for streams supporting Lahontan or Bonneville cutthroat trout and 80% on all other streams" ([Humboldt National Forest Plan], n.d., p. IV-29, IV-49). Most of this portion of the plan is concerned with matters other than the trout.

Further information from this source is important: Nevada contains nearly all of the Bonneville Cutthroat Trout metapopulation designated "Western Bonneville" by the Bonneville Cutthroat authority Don Duff.

A letter from Monica J. Schwalbach, Assistant Forest Supervisor, Humboldt and Toiyable National Forests offers further information: According to "the Forest Service's June 1996 Conservation Assessment for Inland Cutthroat Trout, Bonneville Cutthroat Trout are not warranted for listing under the Endangered Species Act at this time. . . . As a Sensitive Species, Biological Evaluations are written for every project potentially impacting Bonneville Cutthroat Trout Habitat on Forest lands in Nevada" (Schwalbach, letter, 1997, September 3). Petitioner has been unable to locate this conclusion in the Forest Service's June 1996 Conservation Assessment for Inland Cutthroat Trout. No indication is given whether or not the evaluations for sensitive species are actually based on ground/aquatic studies and monitoring.

U.S. Forest Service

The four states which comprise the'historic range of the Bonneville Cutthroat Trout contain a number of national forests; hence the survival of the trout is strongly bound up with its U.S. Forest Service management.

In fact, the main federal agency now involved in conservation of the Bonneville Cutthroat Trout is the U.S. Forest Service, which, based on its past performance, is probably an unsuitable organization for this task. We know that, experientially, conservation is not one of the Forest Service's larger priorities; it is, in fact, the agency

engaged in disposing of national resources, not protecting them. In 1996, only intense protests from the Yellowstone Coalition and others succeeded in putting at least a temporary halt to a proposed timber sale on the Caribou National Forest--and one of the grounds for the protest was that the proposed logging would damage Bonneville Cutthroat Trout habitat. Setting the U.S. Forest Service to watch over wildlife resources is, in the ancient simile, like setting the cat to watch the cream. Petitioner points to the lack of accountable, enforceable, and fully funded standards and guidelines for the Bonneville Cutthroat Trout in current forest plans as continuing evidence of this problem.

Don Duff, a Bonneville Cutthroat Trout authority, and senior member of the Forest Service, in his 1996 Bonneville Cutthroat Trout chapter in the Forest Service's Conservation Assessment for Inland cutthroat Trout (1996), broke down the differentiatable population segments as the Western Bonneville, Bear River Bonneville, Northern Bonneville, and Southern Bonneville. This subdivision is very similar to the one commonly used by the state game and fish agencies in these states. He provided the most detailed breakdown of trout presence and the health of its habitat that is presently available.

Western Bonneville. This population is, roughly, the one that occurs in Nevada. There is a population outside of

the Bonneville Basin proper which may have been placed there naturally as a result of volcanic activity that deflected the Snake River at some point in geologic time, but Duff (1996) states that some have been transplanted.

> Presently, the WB [Western Bonneville] occupies only two sub-basins, both in the Snake Valley Bay arm of Lake Bonneville. The WB has been extirpated in 78% of the major sub-basins of its historical occurrence. . . . Of an estimated 427 historic perennial stream miles in the WB sub-basins less than one percent (0.009) is occupied by two populations on the HNF (Humboldt National Forest]. . . . Based on historic perennial stream occurrence, the assessment estimates that 90% of those stream miles contained WB in all suitable waters; now 99% of the WB populations have been extirpated in perennial streams in the seven WB sub-basins. Existing streams on the four NF's [national forests] have an estimated 132 stream miles of which only 3.2% is occupied by two WB populations. The WB is extirpated on 96% of NF streams on 4 national forests. . . . The Snake Valley sub-basins contain the most studied WB streams of the seven historically occupied basins (Behnke 1976, Hickman and Duff 1978, Duff 1988, Haskins 1993, 1987). Basin on this information an estimated 277 perennial stream miles could have been present within these two sub-basins. Multi-land ownership information is included in this estimate, including NF, BLM, State, and private lands. In Nevada, only one WB populations [sic] on the HNF is a remnant population while the remaining three (a 1 BLM population) are transplants from remnant populations in the Snake Valley area. (Duff, 1996, p. 44-45)

As for the remaining habitat of the Western Bonneville,

> Current habitat assessment for the two occupied sub-basins' overall habitat is fair to good, and the trend is stable. The HNF sub-basins rated as 50% good and 50% fair habitat, with grazing occurring on 100% of occupied streams and mining on 50%. . . . There is also a significant uncertainty relative to condition and trend. Specific comments pointed to on-going land activities, i.e., mining, grazing and roading, coupled with stream de-watering, changes in channel morphology, and terrestrial erosion-instream sedimentation as major factors influencing habitat. (Duff, 1996, p. 45)

Duff also comments on the presence of "Rainbow trout and other hatchery cutthroat . . . identified as exotic species and a threat to WB population recovery in all seven sub-basins" (Duff, 1996, p. 45).

Bear River Bonneville. "This assessment area includes all six sub-basins within the Bear River drainage to the Great Salt Lake" (Duff, 1996, p. 46). This area includes the Wyoming populations and areas on the northern Utah border.

> The amount of historic sub-basin habitat was estimated at 1,958 stream miles. National Forest (NF) historic stream miles (Bridger-Teton, Caribou and Wasatch Cache NF's) account for 29% of total historic stream miles. A total of thirty-six genetically pure BRB [Bear River Bonneville] populations occur, including one lake population (Lake Alice, WY, 231 surface acres). These populations occupy only 7% (140.5 stream miles) of total historic habitats and 25% of NF historic habitat (568 stream miles) in the six sub-basins. Based on the assumption that BRB occupied most usable perennial stream habitat on NF's, it is estimated that BRB populations are 65% extirpated on NF's, and 92% extirpated in historic waters in the six sub-basins. As more quantifiable information becomes available in the future refinement of occupancy, status can be ascertained with more certainty. (Duff 1996, p. 46)
>
> Habitat condition and trend indicates that 95% of habitats are in good condition and 5% fair on the Bridger-Teton NF, while habitat trend is 100% stable on all streams. . . . Information on lands outside NF boundaries is incomplete, but that available indicates some is in fair to poor condition with a decreasing trend. Sedimentation is noted as affecting 100% of BRB populations. Other factors affecting habitat condition are dewatering (13%), and changes in stream morphology and lack of woody debris, both 14%. Land use activities contributing to these factors were identified as grazing (91%) and road construction (68%). Rainbow trout occupy 100% of BRB population habitats in the Smiths and Thomas Forks, while brown trout and other hatchery cutthroat trout occupy 82% and 99% respectively of the same habitats. (Duff, 1996, p. 47)

The upper Bear River sub-basin in Utah, contains five known pure BRB populations all of which occupy habitat on the Wastach-Cache NF. . Current assessment information indicates about 352 historic stream miles with 70% occurring on NFS land. Current occupancy of BRB populations is limited to only 1.9% of NF historic habitat. Occupancy idnicates that BRB populations have been eliminated from about 80% of NF historic habitat upstream of Evanston, WY, and 91% extirpated from total historic habitat. (Duff, 1996, p. 47)

Habitat condition on the Wasatch-Cache NF was indicated to be fair to poor with a stable, but tending toward declining trend. All five BRB populations were stream resident and trends in abundance were stable to declining. Exotic fish, primarily rainbow and other cutthroat, were present in all occupied waters and viewed as a threat. Factors affecting habitat condition in the streams were sedimentation (100%), lack of woody debris (60%), and dewatering (60%). Activities affecting habitat condition were indicated to be grazing (100%), roading (80%), and logging (40%). . . . (Duff, 1996, p. 47).

The Lower Bear River basin consists of four sub-basins covering watersheds on the Bear River from Soda Springs, Idaho, to its entry into the Great Salt Lake. Approximately 1,323 historic stream miles occupy these sub-basins with 27% occurring on NFS lands in two NF's (Caribou and Wasatch-Cache NF's). . . . The assessment indicates the occurrence of six pure BRB populations inhabiting 5% of NFS land on the Caribout NF (18 Stream miles). Population occupancy is only 1% of total historic habitat. Based in stream mileage and occupied habitat, BRB populations are estimated to be 85% extirpated on NFS lands and 87% extirpated within their historic range in all sub-basin waters.

Habitat conditions on BRB populations on the Caribou NF indicate 78% occupy fair habitats and 22% occupy poor habitats. . . . Habitat trend indicates 44% are stable with the status of 56% unknown. Factors indicated affecting habitat condition were identified as sedimentation (100%), water temperature (78%), channel modification (66%) and lack of woody debris (56%). Grazing occurred on 78% of habitats and was indicated as the primary cause of habitat deterioration. (Duff, 1996, p. 48).

Once again, the exotic fish, major threats to the continued existence of the Bonneville Cutthroat, are present.

Northern Bonneville. This population segment is found south of the Bear River populations, approximately from the Weber River sub-basin . . . [to] "the Spanish'Fork-Utah Lake sub-basin. . . . All sub-basins historically contained populations of BCT" of the Northern Bonneville type.

> All four known NB [Northern Bonneville] populations occupy habitat in two sub-basins on the Wasatch-Cache National Forest (NF). No NB populations are known to occur in four sub-basins on three NF's (Uinta, Manti-LaSal, Wasatch-Cache) and are thought to be extinct on NFS lands in these sub-basins. The NB has been extirpated in 67% of the six sub-basins in which they occurred historically. . . . Only 6% of BCT populations on NFS lands in the Basin are NB populations. The NB populations account for only 5% of total BCT populations occurring on all alnds in the Bonneville Basin. (Duff, 1996, p. 49)

Duff (1996) notes that this land was known as early as 1776 and that there exist a number of references to plentiful trout in this particular area in these early records, even though the Northern Bonneville appear to be the rarest of the surviving Bonneville Cutthroat Trout varieties.

> "[D]espite the BCT historic distribution and abundance, human activities, through settlement, began its immediate and rapid decline in the northern Bonneville area. . . . Widespread changes in channel morphology through overharvest, irrigation diversion (beginning in 1847) increased competition and hybridization with exotic fish introduction of disease, destruction of riparian streambank and instream habitat through livestock grazing were the primary causal agents leading to the demise of NB populations. (Duff, 1996, p. 49)
>
> The historical NB riverine habitat was estimated by this assessment at 1,178 stream miles within the four major sub-basins. . . . About 38% of these stream miles were haitoric habitat on three national forests (Wasatch-Cache,

> Uinta, and Manti-LaSal NF's). Occupied habitat occurs only on one NF totaling 7.5 stream miles for four known NB populations, of which two are remnants and two are transplants from remnant stocks. . . . These existing populations occupy only 1.6% of historic national forest habitat. (Duff, 1996, p. 50)

Once again, primary villains in the destruction of the Trout's habitat are grazing and agricultural uses. Duff (1996) does not fully assess habitat conditions in this area--available assessments may have been limited--which may be what some in the field seem to call "lost cause" habitat. This, given that the area has been subjected to intensive agricultural and grazing use from an early period seems only too likely. However, habitat restoration, particularly through Habitat Conservation Plans (HCPs) for private lands should be pursued.

Southern Bonneville. This variety of the trout occurs in south-central Utah "within the Sevier River and Escalante Lake sub-basins" (Duff, 1996, p. 50) and includes, outside the Bonneville Basin proper, the "Upper Virgin River sub-basin). Currently the populations occupy 50% of historic sub-basins being present in four of the eight sub-basins" (p. 51).

> The assessment indicates an estimated 1,565 perennial stream miles historically occurred in the eight sub-basins. . . . An estimated stream miles (31% historically occurred on NFS lands on four NF's. Current occupied habitat occurs on only 7.6% of NF historic habitat for the twenty-three SB [Southern Bonneville] populations on two NF's (Fishlake and Dixie NF's). The SB populations are not known to occur (thought to be extirpated) in historic habitat on the Uinta and the Manti-LaSal NF's in two middle Sevier River sub-basins. Based on historic stream mileage and current occupancy, the

> assessment indicated that SB populations have been extirpated on 98% of the basins historic stream miles and 91% of NF historic stream miles. This includes the ten SB populations (remnant and transplants) occupying waters on the Dixie NF in the Upper Virgin River sub-basin as a result of a possible natural stream capture event. (Duff, 1996, p. 51)

This population was also recorded as observed in early records.

> Current habitat assessment for SB populations indicate 39% in excellent condition (64% Dixie NF), 31% good condition (21% Dixie NF; 67% Fishlake NF), 22% fair condition (33% Fishlake NF; 14% Dixie NF), and 4% each in poor to extremely degraded condition (Dixie NF). . . . Habitat condition on lands adjacent to NF;s were estimated to be extremely degraded (39%+) with greater than 43% trending toward declining condition. (Duff, 1996, p. 52)

Humboldt National Forest

As noted above, some information from a Forest Plan for the Humboldt National Forest has been provided by National Forest personnel. Mining and grazing still appear to be grave hazards to the Bonneville on the Ely Ranger District, both in terms of existing populations and possible reintroductions.

Uinta and Wasatch-Cache National Forests.

These Forests have provided fish surveys for 1995 and 1996. The Uinta National Forest has provided reports on the genetic status of cutthroat trout generally in Holman Creek and "four streams in the Spanish Fork Ranger District, Utah" (Evans and Shiozawa, 1996); Wasatch-Cache made available a report on cutthroat trout genetic status "from various drainages in the Wasatch Cache National Forest" (Shiozawa and Evans, 1995). This is significant, since it indicates that

some necessary research on Bonneville Cutthroat is proceeding. However, Petitioner knows of no management action undertaken to expand existing habitat and populations of the Bonneville on these Forests. The trout still exists in low numbers in small stream reaches with only minimal conservation actions, such as a few exclosures. As is the case on other National Forests, it appears that there have been no changes in land or management policy; lack of accountability at local agency management levels may not be improving the situation. Both the Uinta National Forest and the Wasatch-Cache also made available relevant parts of the undated "Land and Resource Management Plan for the Uinta National Forest" and the "Wasatch-Cache National Forest Land and Resource Management Plan."

Caribou National Forest

This Forest has also provided a fish survey for 1994 and also a partial "Land & Resource Management Plan for the Caribou National Forest & Curlew National Grassland." This management plan is not primarily concerned with the Bonneville Cutthroat, but does have some features intended to improve fish habitat.

Bridaer-Teton National Forest

This National Forest has provided fish surveys for the Kemmerer Ranger District.

Little of the above information is of much use in

perceiving population trends, but will be useful for this and other purposes in the future.

Overall, the figures, where provided, primarily by Duff (1996), suggest that the Bonneville Cutthroat Trout has fared better on National Forest lands than off of them--but not, nevertheless, very well. In cases like the last one discussed above, one of the primary difficulties with the kind of management now in place becomes apparent: the Forest Service cannot even prevent serious degradation of habitat on its own ground, much less on private ground around National Forest boundaries.

A possible reason for the National Forests' better figures as opposed to those for private ground, might be that terrain has often been selected for National Forest at least partly because it seemed less economically exploitable at the time of selection. National Forest figures are not encouraging, but are undeniably better than those for private ground. Hence, despite the Forest Service's often destructive policy of "multiple use," National Forest lands may still be at least somewhat protected by a certain amount of lack of usability for economic purposes.

"Multiple use" is the name of a U.S. Forest Service policy, which it shares with the Bureau of Land Management (BLM). Both of these agencies might be said, intuitively, to have a fairly bad reputation among conservators of the

country's natural heritage, and for much the same reason: Multiple Use is a policy that legitimates the notion that all uses for a parcel of land are equal--that is, grazing, mining, logging, recreation, and wildlife conservation. "Wildlife conservation" is listed last in this paragraph because that is where it usually ends up in the Forest Service agenda. Furthermore, it is in the Forest Service's operational mandate that if two or more uses can be developed, then both, if possible, should be. The Forest Service Manual Policy (FSM 2526) concerning riparian management does indicate that in case of conflicting multiple uses, the riparian ecosystem and its dependent species are to be given management preference and protection. However, it appears that this is rarely done in practice. There is much reason to believe, in this case, as in many others, that information provided by biologists is often neglected and ignored. In practice, if there is a conflict of use, the wildlife goes to the wall, and the exploiters move in. The Forest Service seems to be loathe to make positive wildlife decisions, claiming that this is the province of the states; however, under NFMA language, the Service does have such rights and functions, particularly in the protection of imperiled species habitat.

Thus, the U.S. Forest Service, which could be the best hope for the trout, has tended to turn over fish management to the states--who, with already too-small budgets

--are only too anxious to take the easy way out, even though they do have some funding for restoration of sport fishing from the Fish and Wildlife Service. It is the state agencies that have failed to enforce fully the Clean Water Act; who have favored hatchery stocking over restoration of native populations (as do the Forest Service and the Bureau of Land Management generally); who have had the most to say about hydroelectric facilities; who have allowed too-loose (or no) regulations to avoid angering local constituencies. It is believed that the majority of funds provided by the federal government to the states for sport fish restoration are expended on hatchery operations, which may be inconsistent with all legal requirements.

Perhaps the most exasperating feature of Forest Service policy is their mulish inability to see ecosystems and wildlife as anything but two entirely separate items. However, there are indications that the agency is now beginning to place greater management emphasis on ecosystem management.

Conservation Agreements

Recently, the popularity of Conservation Agreements (CAs) for dealing with the multiplying problems presented by threatened and endangered species has much increased. The essential flaws in this type of protection fall under three headings: 1) the avowed number one intention of these

agreements in almost every case observed is to stave off federal listing of threatened and endangered species; 2) these programs are too often under the influence, or even the control, of precisely those economic interests that caused the problem in the first place--setting the fox to watch the hen house, as one observer put it; and 3) these agreements, no matter how detailed they may be or how sternly they stipulate actions to be taken by signatories, lack accountability and are unenforceable. The Forest Service may sign these documents, but the agency lacks effective internal mechanisms to enforce accountability at any of the "on the ground" levels. It is believed by the Petitioner that Forest Service requested budgets generally do not reflect any adequate increased funding for operations under the conservation agreements they sign. These voluntary participation type agreements are, in the nature of things, unlikely to result in effective protection and full recovery of many threatened and endangered species, including the Bonneville Cutthroat Trout.

To put the matter very bluntly, these programs lie under the suspicion that they constitute mostly window-dressing designed to keep conservationists and the enforceable requirements of the ESA off everyone's back. Even trout Unlimited, in an editorial in its organizational publication, Trout, gently inquired about the "sincerity factor" in state

plans of Oregon and Maine, intended to forestall ESA listing and turning management over to the states. Trout Unlimited, an effective and dedicated national conservation (non-profit) organization, works as tactfully and cooperatively as possible for freshwater fish recovery with the Forest Service and with other entities that might be in a position to help.

An example of this kind of CA is the available draft of a "Conservation Agreement and Strategy for Bonneville Cutthroat Trout (Oncorhvnchus clarki utah) in the State of Utah," issued in March 1997 under the leadership of the Utah Department of Natural Resources, Division of Wildlife Resources. This proposed Agreement is to be "among resource agencies." "Threats that warrant BCT listing as a sensitive species by state and federal agencies and as threatened or endangered under the Endangered Species Act of 1973, as amended, should be eliminated through implementation of this Agreement and the attached Conservation Strategy . . ." (Conservation Agreement, 1997, p. 2). Its Goal is respectable: "Ensure the long-term conservation of BCT within its historic range in Utah" (p. 2). Furthermore, its Objectives (p. 2) have at least a tincture of specificity: "1) Restore and maintain at least 62 conservation populations of BCT throughout 332.1 stream miles and 35,775 surface acres including a sufficient number of metapopulations where possible within five Geographic Management Units (GMU). . . .

2) Eliminate or minimize threat to BCT and its habitat to the greatest extent possible."

Neither of these "objectives" adequately address the Bonneville's real problems. The numbers mentioned in the first (which will be under state control) are too low; the second item is too diffuse for practical application; and in any case, the federal agencies involved (Forest Service and Bureau of Land Management) have no accountability under such an agreement.

The CA's "Status and Distribution of the Bonneville Cutthroat Trout" focuses largely upon the trout's legal standings--S1 in Utah; but the authors, after again raising the specter of federal control, hopefully point out that the Bonneville Cutthroat is really in better shape than it was in the 1970s--as indeed it may well be, bad as that is. The CA then provides broad, non-specific statements describing Conservation Actions as well as organization, monitoring, and funding set-up. There is a time line indicating certain conservation actions to be taken in 1996 and 1997, as well as a proposed budget for various areas of the trout's range, and a brief chart delineating the broadly-stated responsibilities of the various agencies involved. Have all these efforts been implemented, and have they been shown to be effective to date? It does not appear so.

The Draft Agreement in its initial pages, establishing the ground rules for this CA stipulated: "Upon signing, the signatories agree to remove BCT from all lists that require federal and state regulatory administration" (p. 2). It must be said that the Forest Service refused to agree to this item, and it does not appear in the final Agreement. It does give a clear notion of the intentions behind such agreements, however.

The stipulations and rules of the Agreement are set forth in its first pages, and give the CA an air of legitimacy and respectability: we must not, however, forget that such CAs are not enforceable, and funding is not guaranteed to ensure implementation of all necessary conservation measures.

The same is true of another CA that has come to hand and seems to be primarily concerned with lands in the Caribou National Forest: As with the larger, more elaborate CA examined above, this one also gives reasons and goals that include not only the conservation (hopefully) of the trout, but evasion of ESA listing. Its signatories are U.S. Forest Service, Caribou National Forest; U.S. Fish and Wildlife Service; Caribou Cattlemens' Association; Idaho Soil Conservation Commission; and the Idaho Fish and Game Department.

Again: CAs and Memoranda of Understanding (another voluntary arrangement) are not enforceable. It appears that

it is important to the signatories that they should not be. The major indication of this lies in agency management decisions and actions performed on the ground, which are conspicuously absent. This determined evasion of obligations to implement effective wildlife conservation measures may be understandable in some ways, since enforceable regulation could put some of the agencies involved in an untenable position between legal obligations and political pressures.

Uncertainties in Present Knowledge

"Habitat requirements for young Bonneville cutthroat trout are poorly reported in the literature" (Kershner, 1995). Kershner also ended his discussion of the Bonneville Cutthroat Trout with this statement: "The knowledge of the distribution of this subspecies is spotty. We need a full assessment of the historical and current range to accurately document the decline of Bonneville cutthroat trout. In addition, we need to establish the population trends. And given the existing small populations and fragmented habitats, we need to learn how to design effective reserves for the Bonneville cutthroat trout" (Kershner, 1995) "There is no literature that directly assesses the effect of diseases on Bonneville cutthroat trout" (Kershner, 1995). And a perusal of the present document will reveal more of these gaps in the current knowledge of the Bonneville Cutthroat.

These gaps need to be filled in the future, but, once again, it must not be forgotten that while research still needs to be done, enough is currently known about the trout and its needs to implement sound recovery measures. Neither should it be forgotten that demands for more research, though needed, can be used by reluctant agencies to forestall the greater and justified need for action.

The above statements comprise only a small sampling of assertions that knowledge of the trout is at present incomplete. Both Duff and Kershner, of the Forest Service, state repeatedly that this or that (1996; 1995) is "poorly reported," needs further investigation, or that the data is incomplete. Although there exists a daunting pile of minute data concerning the trout, it is not yet complete. Nevertheless, the figures now available clearly show the precipitious decline of the Bonneville Cutthroat Trout. Despite conservation agreements and similar documents, the Bonneville, in the Petitioner's opinion, is still seriously threatened.

Summary of Threats to the Bonneville cutthroat Trout

It is clear that almost all wildlife and species issues, including those involving the continued existence of the Bonneville Cutthroat Trout, are almost infinitely more complex than was thought by the science-proud people who began

stocking exotics in western waters. All too confident of their ability to manipulate the environment and its living creatures, many innovations that were to have grave effects on the future of the earth's environment--not to mention the Bonneville Cutthroat Trout--were enthusiastically, even recklessly, instituted without any remotely accurate notion of the possible consequences. Jolly fishing parties pulled hundreds of trout out of western waters, in a single day's fishing, without the slightest concern for the continuance of any particular species. To these still-unknowledgeable people, a trout was a trout--so why not stock rainbows? The replacement of native cutthroat trout was so thorough--replaced by rainbow, brown, brook, and lake trout--that many of us "knew" these were the region's native trout. They are not.

The people who snatched most of the trout from western streams and lakes in the nineteenth and early twentieth centuries, and then replaced them with the wrong kind of fish, fell victim to a tendency we-humans have of thinking we know more than we really do, especially under the sweeping influence of the rising prestige of science. Making irreversible changes in the trout's habitat on the basis of still-insufficient knowledge is a mistake that must not be repeated at this critical point. Ignorance and lack of information are real threats to the trout.

The other major threats to the Bonneville Cutthroat Trout appear on almost every page of this report; and it should not be forgotten that these threats also menace the continued existence of other species in the Bonneville's ecosystem.

1. Today, sophisticated techniques for differentiating the various trout species and subspecies and for estimating their purity in terms of intermixing with exotics have been developed, and they seem to be accepted as reliable in the literature; however, not all populations have been tested, and both Duff (1996) and Kershner (1995) among others appear to accept the belief that the competition and interbreeding with the exotics constitute the greatest peril to the continuing existence of Oncorhvnchus clarki utah. It is possible that this interbreeding may not only lose the trout's genetic identity, but may also neutralize or eliminate important survival characteristics.

2. Grazing. It is clear that grazing is the biggest villain in much of the habitat destruction threatening the Bonneville Cutthroat Trout as well as a good many other species. Much of the land where Bonneville Cutthroat are found in streams is intensively devoted to cattle raising. Cattle grazing in riparian areas results in disturbed stream banks, attendant loss of cover, sedimentation, and dangerous temperature changes. The effects of grazing snowball:

sedimentation, for example, raises water temperature to levels not tolerable for the trout, reduces and/or eliminates key macroinvertebrates which are important to the trout's food supply, can obliterate the stream substrate it needs for spawning, and suffocates trout eggs in gravels.

3. Road building. Road building has also been a major factor in sedimentation and in cutting off trout migration by the use of culverts. Additionally, road building has increased access to the trout as a game fish, another hazard. How much of a threat overfishing is in the decimated condition of the Bonneville is wholly unknown; but most of us know of our own knowledge that not everyone respects Fish and Game Department catch limits.

4. Agricultural uses of water. As has been shown above, with the grimmest examples recounted by the Idaho state agency, local ranchers and farmers have not scrupled to remove all of the water from some streams to further their agriculturally related operations. Farmers, ranchers, and livestock grazers are often the source of much of the pressure on managing agencies that should be protecting the trout and other wildlife. It seems plainly obvious that political considerations have prevented a close look at the situation; that available waters in this region have been over-allocated; indeed, the original over-allocations may well have resulted from intense political pressure. The restoration of year-

round instream flow rates is a goal that would benefit the Bonneville Cutthroat Trout and many other aquatic species. As it stands, however, few states have instream flow laws to protect fisheries as beneficial users of water. The-Forest Service cannot even provide by-pass flow under special use permits to ensure instream flow to maintain streams and their biological resources.

Other agricultural uses of water that are injurious to the trout are channel modification and retention. In some instances, streams have been cut off and rechanneled into other streams. This has degraded, often eliminated, trout habitat and has isolated some populations.

5. Mining. Mining operations are found in all of the states mentioned, and constitute another hazard to the trout, partly because of sedimentation, partly because of possible toxic chemicals accompanying the sediment, and very largely because of the crude road building that generally goes with mining. This road building results in excessive sedimentation from runoff into creeks and migration blockage by road culverts.

6. Logging. Again, road building and stream pollution accompany other ill effects of logging.

Benefits of ESA Listing for the Bonneville Cutthroat Trout

As can be seen from the sources of the material above, U.S. Forest Service personnel have done close and careful assessment of several native cutthroat trout, including the Bonneville Cutthroat, but their work is still incomplete, as they themselves state. Further, it becomes clear from the data they provide that their agency's protection of the trout has been less than accountable, efficient or enthusiastic in the past. It has been repeatedly pointed out in the pages above and in the statements of Bonneville Cutthroat Trout authorities, that research on the trout and its surrounding issues is not complete. Hence, to begin with, this research must be better funded, coordinated, and administered. If this is to be done effectively, in a manner that well coordinates the range-wide efforts of all states and agencies, it will need federal organizing and directing powers: The Department of the Interior, the U.S. Fish and Wildlife Service, under the mandate of the ESA.

Further, the Forest Service has been unwilling or unable to act upon the data available. While the Forest Service must become more accountable, ESA listing can provide coordinated management and neutralize less than energetic efforts of other agencies.

Among the major problems for any agency undertaking any program to protect the trout are:

1. Inadequate funding: A crippling problem for virtually any state agency confronted with a major ecological task, especially when the legislatures that allocate funding are heavily influenced by interest groups opposed to preservation. If that were not the case, it must be considered that most state governments cannot afford such projects. Federal funding and administration of funding from all sources is needed. Again, while the Forest Service undoubtedly needs more money, it now has both funds and personnel; but is unwilling to make changes in its priorities to adequately cover the conservation of the Bonneville Cutthroat. The Forest Service is undoubtedly concerned about the Bonneville in terms of its threatened and endangered species program, but it continues to fail to bring this concern into on-the-ground action. This should be the responsibility of Regional Foresters.

Further concerning lack of funding, Petitioner notes that, in the past, this has provided another escape route for agencies not wanting to assume conservation responsibilities.

2. No agency, except the U.S. Fish and Wildlife Service, under the mandate of the ESA, will have the overarching ability to override the clashing interests and the intricately entangled networks of ownership and administration that this region of the West presents.

All (the Idaho, Wyoming, and Utah agencies with Nevada largely silent and apparently inert) have emphasized the necessity of close cooperation among all the agencies and private groups involved, and there is no doubt that without such close cooperation, the project of saving and restoring the trout would be hopeless.

But even on the very face of it, this kind of cooperation may not be possible without added inducements and statutory protection for the trout. Even one sub-basin could easily contain enough conflicts of interest, agency and private, to keep an ordinary, diligent agency or court busy for some very considerable time.

3. Local social, economic, and political pressures can be and are occasionally paralyzing to state and national agencies that have to deal with them.

Although both the agencies and the states are anxious to ward off federal listing, no state or agency wants the financial burden, or, in some areas, the political odium of wildlife protection and recovery. The listing of the Bonneville Cutthroat Trout as "Threatened" can begin to solve its problems--and the problems of other species that share its ecosystem--with a well-coordinated and cost-effective approach to wildlife protection.

Each and every one of the threats to the trout have come about because groups or individuals have extracted profit

of some kind from engaging in the activities that caused the threats. The grazing industry, at this particular point in time, appears to be among the best organized and most truculent in defense of what they believe to be their rights. Water in the West is proverbially a vexed question at the very best. Water is and has been historically the point of contention in Western legal battles; one that has not infrequently come to violence. All those dewatered streams no longer available to the trout (and the other creatures in its aquatic ecosystem) were diverted by some folks who thought they had a right to all the water. They too will be (more realistically, are) determined opponents to needed conservation measures. A larger authority than that which can be provided by state and agency administration will be needed. Positive incentives and Habitat Conservation Plans (HCPs) would be helpful in encouraging many of these private interests to work for recovery of the Bonneville Cutthroat Trout and its aquatic ecosystems.

However, there is a difficult and more substantive issue to deal with here: the basic fact that the West is very largely dry land country, and water is critical to many of the businesses currently found in it. Fair and workable solutions to questions concerning amounts of water to be made available and its distribution will have to be guided by policy, the use of sound science, and administration from

above, but with cooperation from, state and local levels. It should be noted that 50% of municipal water supplies in the West come from National Forest Lands.

It is imperative to maintain year-round instream flow rates--that is, keep the water in the streams--and, in the process, maintain good fish habitat. With better, more equitable management, healthy streams could be of great benefit to the people living in the Bonneville's range as well as to stream- and riparian-dependent wildlife.

An overall policy and administration, such as ESA listing and protection can provide, is especially applicable in the Bonneville Cutthroat case: it is, after all, stream habitats that are involved. In other words, it may not be possible to have, for example, a couple of miles of excellent trout habitat while two miles of stream bank above it are used for grazing or mining. A stream, we are almost tempted to remind people who ought to know it, is a continuous entity and cannot be cut up into discrete segments except on a property map.

Applicability of Listing Criteria

The criteria for listing of a species under the ESA are:

1. The present or threatened destruction, modification, or curtailment of habitat or range;

2. Overutilization for commercial, recreational, scientific, or educational purposes;

3. Disease or predation;

4. The inadequacy of existing regulatory mechanisms; and

5. Other natural or manmade factors affecting its continued existence."

Petitioner understands that if a species' circumstances fit any one of the five criteria shown above, congressional mandate requires its listing under the ESA. It can be demonstrated that in the recent past, the status of the Bonneville Cutthroat Trout has fitted four of the criteria, and with the advent of whirling disease, it presently fits all five.

1. <u>The present or threatened destruction. modification. or curtailment of its habitat or ranse</u>.

It seems clear that the major factor militating against the continued existence of the Bonneville Cutthroat Trout lies in habitat loss. The activities that have resulted in this habitat loss have been stated repeatedly in the pages above: Grazing, irrigation, mining, lumbering, road building, and sometimes recreation. Each of these leads to the degradation, or even removal, of the trout's stream habitat and/or contributes to the isolation of remaining populations.

There is no dearth of information about the Bonneville Cutthroat Trout's needs and the reasons for its decline; loss of habitat and hybridization are undoubtedly at the top of

the list, and yet this information is not complete. Trout Unlimited, an important conservation organization working for restoration of native cutthroat trout points out that in order to conserve these trout most efficiently, more research and long-term monitoring will be necessary.

While the Bonneville Cutthroat Trout's range does not seem to have been much reduced in geographic area (except, perhaps for the initial drying up of Lake Bonneville itself), the species' occupied range has, in effect, simply been degraded and blown apart by human activities. That is, there are still fragmented populations of Bonneville Cutthroat Trout in much of its historic range, but these fish have been greatly reduced in numbers and now amount to little more than remnant and/or hybrid populations. Population declines are expected to continue in response to habitat degration and destruction.

2. Overutilization for commercial, recreational, scientific, or educational purposes. The Bonneville Cutthroat Trout was captured commercially in the past, which contributed to its initial declines in the nineteenth century, as did excessive angling. At present, the states that have reported their practices have severely reduced or eliminated Bonneville Cutthroat takes for recreational fishers. The effectiveness of this kind of regulation remains to be seen. The "overutilization for commercial, recreational, scientific or

educational purposes" was such that Brigham Young himself made an attempt to stop excessive fish take in the early years of settlement. Ironically, his directives were not enforced (as so frequently happens today), and the eventual result was the extirpation of the Utah Lake and Jordan River populations of the trout. We are also reminded that the legal limits for recreational take are not really fully enforceable and there is reason to suspect that many fishers do not honor them. Also, there do not appear to be any accurate estimates of actual trout mortality associated with "catch and release" policies.

3. Disease or Predation; The fish populations in the Bonneville's territory are subject to some diseases, mainly "hatchery diseases," but none of these appear to be a major factor; however, whirling disease, another hatchery disease, has arrived in Bonneville habitat and seems to be spreading rapidly. This development could be deadly to the trout.

Whirlina disease. Considerable apprehension has been expressed by scientists as whirling disease has moved into the Yellowstone River, detected within the last year (Bozeman Chronicle, 1997). Very recently the disease has been detected in the Sevier River of Utah. It was widely believed among researchers in the past that wild trout populations were not vulnerable to this disease, but recent findings have proved

this notion to be wrong (Nehring and Nickum, n.d.). Rainbow trout appear to be the most susceptible to whirling disease, which has accounted for catastrophic drops in rainbow populations in a number of western rivers.

However, the native cutthroats, it has been realized following tests in 1995 and 1996, can be affected as readily by whirling disease as rainbows (Nehring and Nickum, n.d.). The brown trout seems more impervious to it, but it too is susceptible and has been found to have whirling disease.

The symptoms of whirling disease "in salmonid fry and fingerlings can include: blackening of the tail; severe bending of portions of the vertebral column (lordosis and/or scoliosis); shortened snouts and other deformities of the cranium, upper jaw, lower jaw, and orbits of the eyes (causing a bug-eyed appearance); and the erratic tail-chasing behavior for which the disease is named" (Nehring and Nickum, n.d., n.p.).

Whirling disease is caused by a microscopic parasite, Mvxobolus cerebralis), which infects tubifex worms (Tubifex tubifex) that live in aquatic environments. These produce tubifex worms, which in turn produce triactinomyxon spores. These are ingested by the trout which can also be infected by contact with the triactinomyxon spores. A particularly ominous feature of whirling disease is the difficulty, perhaps the impossibility, of getting rid of it. When the tubifex

worms find no hosts, their spores can survive in the substrates for a very long time until a new host comes along.

This disease was found in the Yellowstone River in July 1997 and in the Madison River, as well as in Utah rivers; there is no doubt that whirling diease is spreading rapidly, and spreading into Bonneville habitat.

4. The inadequacy of existing regulatory mechanisms. Land ownerships and management agencies abound in the trout's range: state and federal, and private ownership as well. Ownership and management authorities are so intricately snarled, and so full of opposing interests that it may be difficult or impossible to disentangle them; federal management can override these otherwise inextricable knots. Many private landowners in the West are notoriously uncooperative in conservation matters, and industrial interests often have power difficult to challenge. Positive incentives, such as HCPs, will be needed to prod private landowners to participate in effective recovery efforts. Additionally, greater accountability is needed in federal agencies.

5. Other natural or manmade factors affecting its continued existence. In addition to the manmade detriments, the trout has faced natural difficulties in the last decade as an extended drought has lessened its habitat quality, and, as well, has introduced further uncertainty into attempts to

assess the health and status of its habitats. Generally, speaking, streams that have not been impacted by human activities (and there are few of them) are functioning and their trout are surviving.

There are so many manmade threats to the trout that we can only express surprise that there are any trout left.

However, there is one manmade hazard that some experts feel is the most threatening of all to the continued existence of the trout: introduction of exotic species. As the Idaho Department of Fish and Game Conservation Assessment and Strategy (1994) pointed out, there have even been times when it has been necessary to risk the possible damage to genetic variability in the Bear Lake population to prevent the probability that no Bonneville Cutthroat Trout at all would be spawned.

It should be noted that all states should be required to do in-depth assessments of their stocking and hatchery programs to ensure management and culture operations do not or will not impact Bonnevilles or other native fish. If this is not done, HCPs and other conservation arrangements will be of no value. Stocking will continue fruitlessly if states and federal agencies do not coordinate stocking activities. This is another area in which ESA listing could be helpful.

critical Habitat

This petition requests that critical habitat be designated for the Bonneville Cutthroat Trout within a reasonable period of time following ESA listing, when-critical habitat can reasonably be determined. "Service regulations (50 CFR 424.12(a)(2) state that critical habitat is not determinable if information sufficient to perform required analyses of the impacts of the designation is lacking or if the biological needs of the species are not sufficiently well known to permit identification of an area as critical habitat" (Federal Resister, 1991, p. 49656 If, in light of these considerations, critical habitat cannot be determined and designated within the prescribed one-year period following listing, the petitioner understands that listing will, in itself set in motion "protection of this species' habitat [which] will be addressed through the recovery process and through the section 7 jeopardy standard" (Federal Resister, 1991, p.49656, re: Gulf Sturgeon).

It is to be hoped that other management agencies could, in the interim before the U.S. Fish and Wildlife Service designates critical habitat for the Bonneville, identify and designate "essential habitat."

Summary

The plight of the Bonneville Cutthroat Trout began, perhaps, with the drying up of the ancient Lake Bonneville;

but the trout stranded, in metapopulations around the former giant lake, adapted to stream life and carried on, quite healthily as it turned out. But as has happened so often in American history, the advent of white settlers meant-trouble for the trout. It is painful to read the records of Anglo settlers who spread out over the North American continent. They took positive pride in catching hundreds of fish on a single fishing trip; in never leaving a tree standing of the forests they cut down; they never noticed anything at all wrong with leaving a mountainside in a sea of mud and stumps following intensive placer operations. They just didn't really notice things like that. Nevertheless, it may be that this crisis over the last remnants of the natural world in which we are at present involved, with the Bonneville Cutthroat as its focus in this particular document, will prove to be one more lesson for human beings in the service of human evolution: learning to value and understand other life forms.

This document has reiterated the threats to the trout--grazing, irrigation, mining, logging, road building, development, recreation, not to mention lack of accountability or proactive programs among agencies. Each of these activities has its consequences, all of them destructive to the Bonneville's ecosystem. The problems are much the same over the trout's entire range: grazing, water diversion, dewatering, retention, mining, logging, roading, recreation.

If the Bonneville cutthroat Trout is to be saved from extinction, management across its range must be coordinated by an agency with the mandate, responsibility, and authority to do so. A number of state and federal land management agencies have stated plainly that they have developed their respective Bonneville Cutthroat conservation programs for the purpose of avoiding federal listing--they hope to stave off listing by banding together, busily making mutual, voluntary agreements and holding meetings. We have noted the likely effectiveness of these activities. They are working to keep management of the trout in their own hands--the very agencies that have allowed the hapless trout to land in its present plight. These agencies have already demonstrated that they often lack the ability and the political and stewardship will to save the Bonneville Cutthroat. Even though they are under budget constraints, agencies have declined to make necessary decisons and take necessary actions; they are subject to the highly pitched stresses of economic, social, and political pressures. They have the fewest defenses against them and against the combative attitudes of couldn't-care-less economic interests who originate these pressures.

The Bonneville Cutthroat Trout is clearly biologically threatened in a significant portion of its known historic range and merits a Threatened listing and protection under the ESA. The Bonneville Cutthroat Trout is, therefore,

petitioned to be listed as Threatened where it still occupies habitat within its historic range in the contiguous United States.

Petitioner will expect to receive a formal acknowledgement of this petition and a decision within 90 days of its receipt on whether a listing of the Bonneville Cutthroat Trout under the Endangered Species Act may be warranted.

Respectfully submitted,

Jasper Carlton

D. C. "Jasper" Carlton
Director

copy: Bruce Babbitt, Secretary of the Interior